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On the nature of phase conversions and transformations in porous system in hydrothermal processing of χ-Al2O3 into boehmite

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Abstract

© 2016, Pleiades Publishing, Ltd.Study of the influence exerted by conditions of hydrothermal treatment of χ-Al2O3 on the phase composition and porous system parameters of the resulting products at T = 150–200°C and P = 0.5–1.5 MPa demonstrated the products formed in hydrothermal treatment of χ-Al2O3 are the bayerite and boehmite phases formed simultaneously in parallel pathways. Bayerite crystals have a needle-like shape and length of about 10 nm. 3D boehmite crystals are formed as parallelepipeds with edge size exceeding 200 nm in an alkaline medium at pH 8.0–9.2 and as 2D particles having the shape of rhombic plates with edge size of 80–500 nm and thickness of 20–100 nm at Ph 4.0–6.0. The crystallization of coarse boehmite particles favors formation of coarse mesopores and a low-porous system. A full phase transition of χ-Al2O3 to boehmite occurs at 180–200°C in 180–240 min.

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